

\$15

LPS-151/152

dc tracking power supply



instruction manual

LEADER
FOR PROFESSIONALS WHO KNOW
THE DIFFERENCE

LPS-151/152
DC TRACKING POWER SUPPLY
TABLE OF CONTENTS

| | |
|--|----|
| 1. DESCRIPTION | 1 |
| 2. FEATURES | 1 |
| 3. SPECIFICATIONS | 1 |
| 4. CONTROLS AND CONNECTORS | 2 |
| 5. OPERATING PRECAUTIONS | 4 |
| 5.1 Input Power | 4 |
| 5.2 Output Terminals | 4 |
| 5.3 General | 4 |
| 5.4 Environmental Considerations | 4 |
| 6. POWER SUPPLY OPERATION | 4 |
| 6.1 +6V Range Source | 4 |
| 6.1.1 Operation at a Constant Voltage | 4 |
| 6.1.2 Operation Using Current Limiting | 4 |
| 6.2 $\pm 25V$ Range Sources | 4 |
| 6.2.1 Fixed Tracking Mode, Constant Voltage Operation | 4 |
| 6.2.2 Variable Tracking Ratio Mode, Constant Voltage Operation | 5 |
| 6.2.3 Operation Using Current Limiting | 5 |
| 6.2.4 Voltage Settings Above 25V, Constant Voltage Operation | 5 |
| 6.2.5 Voltage Settings Above 25V, with Current Limiting | 5 |
| 7. CALIBRATION PROCEDURES | 5 |
| 7.1 Preparation | 5 |
| 7.2 Adjustment of Meter Zero with Power On | 6 |
| 7.3 Adjustment of the Voltmeter with Power On | 6 |
| 7.4 Ammeter Adjustments | 6 |
| 7.5 Connections for Other AC Line Voltages | 7 |
| 8. PARTS LISTS | 8 |
| 8.1 LPS-151 Parts List | 8 |
| 8.2 LPS-152 Parts List | 10 |
| 9. BLOCK DIAGRAMS, PC BOARDS, AND SCHEMATICS | 12 |



Figure 1-1. DC Tracking Power Supply

1. DESCRIPTION

The LPS-151/152 DC Tracking Power Supplies each provide three regulated voltage sources, covering the 0 to 6V, 0 to 25V and 0 to -25V ranges. The +25V and -25V range sources can also be used in a voltage tracking mode. These power supplies are equipped with a built-in voltmeter and ammeter so that the output conditions for each section of the supply can be monitored individually.

2. FEATURES

1. The +25V and -25V sources can be used in a voltage ratio tracking mode.
2. A source of 50V may be obtained by connecting the load across the +25V and -25V terminals.
3. Voltage and current settings are made via front panel controls and can be monitored on the built-in voltmeter and ammeter.

3. SPECIFICATIONS

Voltage and Current Ranges

| Model | Output Voltage Range | Output Current Range |
|---------|----------------------|----------------------|
| LPS-151 | 0 to 6Vdc | 0 to 3A |
| | 0 to 25Vdc | 0 to 0.5A |
| | 0 to -25Vdc | 0 to 0.5A |
| LPS-152 | 0 to 6Vdc | 0 to 5A |
| | 0 to 25Vdc | 0 to 1A |
| | 0 to -25Vdc | 0 to 1A |

Ripple:

Less than 3mV_{p-p}

Line Regulation (output stability):

Less than 3mV plus 0.01% of the input change for a 10% change of line voltage.

Load Regulation:

Less than 3 mV plus 0.01% of the load value from no load to full load.

Tracking Voltage:

In the ratio tracking mode, the -25V source tracks the +25V source by an adjustable ratio of 50 to 100%.

Voltmeter:

0 to 7 volts and 0 to 30 volts on a dual scale. The meter range and polarity are determined by pressing the appropriate METER switch.

Voltmeter Accuracy:

5% of the full scale reading.

Ammeter:

LPS-151: 0 to 0.6 amperes and 0 to 3.5 amperes on a dual scale.
LPS-152: 0 to 1.2 amperes and 0 to 6 amperes on a dual scale.

The meter range and polarity are determined by pressing the appropriate METER switch.

| | | | |
|------------------------------|---|-----------------------------|---|
| Ammeter Accuracy: | 5% of the full scale reading. | Operating Temperature Range | 0° to 35°C (32° to 95°F) |
| Insulation Voltage: | 1500 Vac applied for one minute between one of the ac input terminals and the case of the power supply. | Operating Humidity Range | 30 to 85% (non-condensing) |
| Circuit Protection: | Overload protection circuit with automatic resetting by sensing a constant current. | Storage Temperature Range | -20 to +70°C (-4 to 158°F) |
| Power Consumption: | LPS-151: approx. 120VA LPS-152: approx. 220VA | Size (W x H x D) | LPS-151: 8½ x 5¼ x 13 in. 215 x 132 x 332 mm. LPS-152: 8½ x 5¼ x 14½ in. 215 x 132 x 360 mm. |
| Heat Sink Temperature Range: | At room temperature (23 to 25°C) 85°C (185°F) with 100% load. | Weight: | LPS-151: 13½ lbs.; 6.1 kg LPS-152: 15¾ lbs.; 7.5 kg |
| | | Supplied Accessories: | Instruction Manual |

4. CONTROLS AND CONNECTORS

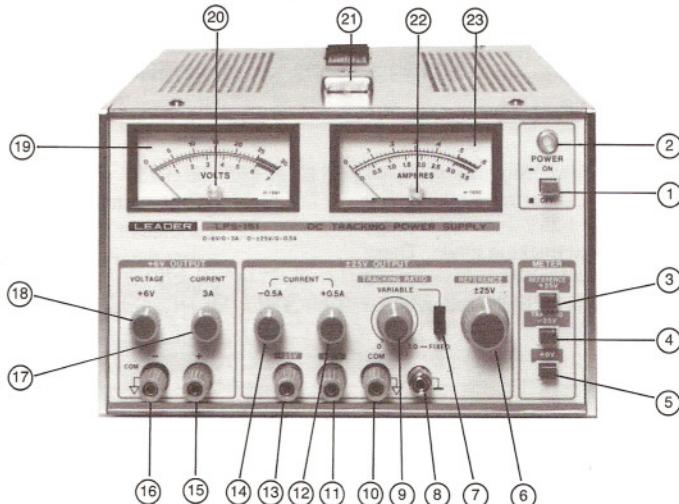


Figure 4-1. Front Panel

Front Panel. Refer to Figure 4-1.

- ① POWER Switch Press to turn on power. Press again to release button and turn off power.
- ② Pilot lamp Lights when power is on.
- ③ METER selector switches These switches assign the voltmeter and ammeter to one of the ranges. (3) is for the +25V source, (4) is for the -25V source, and (5) is for the +6V source.
- ④
- ⑤
- ⑥ REFERENCE/±25V Control This provides output voltage level setting for the +25V and -25V range sources.

⑦ TRACKING RATIO Selector Switch In the FIXED position, the REFERENCE/±25V control (6) sets both 25V sources to the same magnitude but opposite polarity. In the VARIABLE position, ratio tracking of the -25V source using the +25V source as a reference is possible.

⑧ Case ground terminal This terminal is connected directly to the case

⑨ TRACKING RATIO Control This control determines the tracking ratio for the -25V source. When the TRACKING RATIO selector switch is in FIXED, this control is disabled.

| | | | |
|--|---|----------------------------|---|
| (10) COM terminal | This is the common point for the +25V and -25V sources. This terminal is internally connected to COM terminal (16) for the 6V source. | (18) VOLTAGE +6V control | This sets the output voltage for the +6V source. |
| (11) +25V Source output terminal | | (19) Voltmeter | Gives voltage indication in the +25V and +6V ranges, selected by one of the METER (3), (4), and (5) buttons. |
| (12) CURRENT control LPS-151:+0.5A LPS-152:+1A | This sets the output current limit for the +25V source. It is adjustable from 0A to the full load current rating. | (20) Voltmeter Zero adjust | |
| (13) -25V Source output terminal | | (21) Handle | |
| (14) CURRENT control LPS-151:-0.5A LPS-152:-1A | This sets the output current limit for the -25V source. It is adjustable from 0A to the full load current rating. | (22) Ammeter Zero adjust | |
| (15) 6V Source output terminal | | (23) Ammeter | Gives current indication in the ±25V and +6V ranges, selected by one of the METER mode (3), (4), and (5) buttons. |
| (16) COM terminal | Common terminal for the 6V source. This terminal is internally connected to COM terminal (10) for the +25V and -25V sources. | | |
| (17) CURRENT control LPS-151: 3A LPS-152: 5A | This sets the output current limit for the 6V source. It is adjustable from 0A to the full load current rating. | | |

Rear Panel. Refer to Figure 4-2.

| | |
|----------------|--|
| (24) AC Cord | Power cord, 3-wire grounded |
| (25) Fuse | LPS-151: 120V operation, 2A slow blow 240V operation, 1A slow blow |
| (26) Heat sink | LPS-152: 120V operation, 3A slow blow 240V operation, 1.5A slow blow |
| | Dissipates heat to ensure proper power supply operation. |

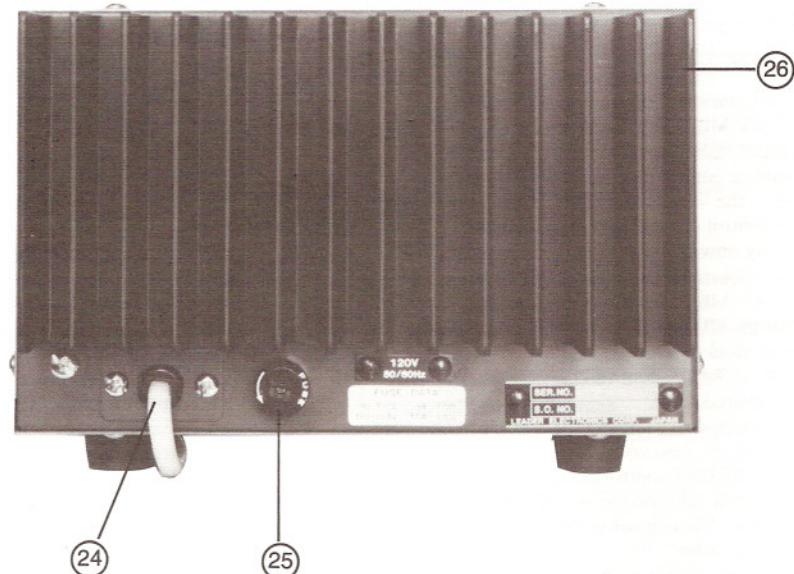


Figure 4-2. Rear Panel

5. OPERATING PRECAUTIONS

5.1 INPUT POWER

Line voltage should be within $\pm 10\%$ of rated voltage (100V, 120V, 200V or 234V). Units shipped within the U.S. are set for 120Vac. Permissible operating range is 108 to 132 Vac. To adapt the unit to other voltages, see Section 7.5.

5.2 OUTPUT TERMINALS

1. Connecting COM terminal (10) or (16) to case ground terminal (8) renders both COM terminals grounded to the case.
2. In the case where a voltage output in the 25 to 50 volt range is obtained by a connection across the +25V and -25V terminals, ensure that both COM terminals are ungrounded.
3. In all cases, ensure that connections to the output terminals of the power supply are made with lead wire of a sufficient rating for the current being drawn from the supply.

5.3 GENERAL

1. The red zones on the voltmeter and ammeter indicate out of specification readings. Do not operate the power supply under conditions that cause red zone readings.

2. When replacing the fuse, ensure that the AC line cord has been removed from the power source.
3. When long lead wires are used to connect a load to the power supply, currents may be induced in the leads by stray electromagnetic fields. These currents may cause oscillation in the power supply. In order to maintain the power supply stable, connect an appropriately valued electrolytic capacitor at the load. Also note that the use of long lead wires tends to increase voltage regulation.

5.4 ENVIRONMENTAL CONSIDERATIONS

1. Avoid operation of the power supply under the following conditions:
 - a. Dusty environments
 - b. High humidity
 - c. Poor ventilation
 - d. Near other power sources
 - e. Exposed to direct sunlight
2. The ambient temperature for power supply operation should be in the range from 0° to 35°C (32° to 95°F).
3. Ensure that the power supply is kept well ventilated. This includes keeping the area around the supply clear, especially the heat sink section.

6. POWER SUPPLY OPERATION

For all operation, the power cord must be connected to an AC power source of the proper voltage and frequency. The unit is turned on by pushing the POWER button (1) in. The green LED (2) should light when the unit is turned on.

6.1 +6V RANGE SOURCE

1. Operation at a Constant Voltage
 - a. Press the +6V METER selector button (5).
 - b. Turn the CURRENT control (17) fully clockwise.
 - c. Use the voltage control (18) to set the voltage to the desired level on the VOLTMETER (19). (Clockwise rotation of the control causes voltage to increase.)
 - d. The load may now be connected to the supply.
2. Operation using current limiting.
 - a. Press the +6V METER selector button (5).
 - b. Ensure that the CURRENT control (17) is turned to its fully counterclockwise position.
 - c. Using the VOLTAGE control (18), set the output voltage to the desired level.
 - d. Short circuit output terminals (15) and (16). The voltmeter will indicate zero volts.
 - e. Using the CURRENT control (17), set the current limiting to the desired value on the AMMETER (23). Rotating the CURRENT control (17) clockwise raises the current limit setpoint.
 - f. Remove the short circuit from output terminals (15) and (16).
 - g. The load may now be connected to the supply.

6.2 $\pm 25V$ RANGE SOURCES

The $\pm 25V$ sources may be operated in one of two modes. In the FIXED TRACKING mode, the output of the -25V source will track the setting of the +25V source in a 1:1 ratio. In the VARIABLE TRACKING RATIO mode, the output of the -25V source tracks the output of the +25V source by a ratio that is adjusted by the user.

6.2.1. FIXED TRACKING mode, constant voltage operation

- a. Push the REFERENCE +25V METER selector button (3).
- b. Ensure that the TRACKING RATIO selector switch (7) is in the FIXED position.
- c. Turn CURRENT controls (12) and (14) to their fully clockwise positions.
- d. Turn the REFERENCE $\pm 25V$ control (6) to the desired positive voltage level. This will also cause the -25V source to be set at the same voltage with the opposite polarity.

To confirm this, press the TRACKING METER -25V selector button (4). It should indicate the same voltage magnitude as the +25V range reading, within 1.5%. After the comparison, press the REFERENCE +25V METER selector button (3) again.

- e. The load may now be connected to the supply.

6.2.2. Variable Tracking Ratio Mode, Constant Voltage Operation.

- a. Push the +25V METER selector button (3).
- b. Ensure that the TRACKING RATIO selector switch (7) is in the VARIABLE position.
- c. Turn the CURRENT controls (12) and (14) to their fully clockwise positions.
- d. Turn the REFERENCE/+25V control (6) to the desired positive voltage.
- e. Push the TRACKING -25V METER selector button (4).
- f. Using the TRACKING RATIO control (9), set the -25V source to the desired negative voltage.

After the TRACKING RATIO control (9) has been set, turning the REFERENCE/+25V control (6) will cause the -25V source to change its voltage with respect to the +25V source by the established ratio.

- g. Press the REFERENCE +25V METER selector button (3).
- h. The load may now be connected to the supply.

6.2.3. Operation Using Current Limiting

- a. Set the CURRENT controls (12) and (14) to their fully counterclockwise positions.
- b. Set the $\pm 25V$ sources to the desired voltage by using one of the procedures above. Disregard the step involving turning the current controls fully clockwise.
- c. Ensure that the REFERENCE +25V METER selector button (3) is pressed in.
- d. Short circuit the COM and +25V terminals (10) and (11). The voltmeter will indicate zero volts.
- e. Set the +0.5A (+1A for the LPS-152) CURRENT control (12) to the desired level of current limiting as indicated on the AMMETER (23). Rotating the CURRENT control (12) clockwise raises the current limit setpoint.
- f. Remove the short circuit from the COM and +25V terminals (10) and (11).
- g. Press the TRACKING -25V METER selector button (4).
- h. Short circuit the COM and -25V terminals (10) and (13). The voltmeter will indicate zero volts.
- i. Set the -0.5A (-1A for the LPS-152) CURRENT control (14) to the level of current limiting desired as indicated on the AMMETER (23). Rotating the CURRENT control (14) clockwise raises the current limit setpoint.

- j. Remove the short circuit from the COM and -25V terminals (10) and (13).

- k. Press the REFERENCE +25V METER selector button (3).
- l. The load may now be connected to the supply.

6.2.4. Voltage Settings Above 25V, Constant Voltage Operation.

Used together, the $\pm 25V$ sources will produce a maximum output of 50V. However, in this mode the 6V output may not be used.

- a. Press the REFERENCE +25V METER selector button (3).
- b. Set CURRENT controls (12) and (14) to their fully clockwise position.
- c. Ensure that the TRACKING RATIO selector switch (7) is in the FIXED position.
- d. Turn the REFERENCE/+25V control (6) such that the voltmeter (18) indicates one-half of the desired voltage value. Remember that the voltmeter will only indicate one-half of the voltage value between the $\pm 25V$ output terminals (11) and (13).
- e. The load may now be connected to the supply. The maximum current available at 50V is 0.5A (1.0A with the LPS-152).

6.2.5. Voltage Settings Above 25V with Current Limiting.

- a. Set the CURRENT controls (12) and (14) to their fully counterclockwise positions.
- b. Set the +25V sources for above 25V operation by using the procedure above. Disregard the step involving turning the current controls fully clockwise.
- c. Ensure that the REFERENCE +25V METER selector button (3) is pressed in.
- d. Short circuit the +25V and -25V terminals (11) and (13). The voltmeter will indicate zero volts.
- e. Set the +0.5A (+1A for the LPS-152) CURRENT control (12) to the desired level of current limiting as indicated on the AMMETER (23). Rotating the CURRENT control (12) clockwise raises the current limit setpoint.
- f. Remove the short circuit from the +25V and -25V terminals (11) and (13).
- g. The load may now be connected to the supply.

7. CALIBRATION PROCEDURES

The following instructions detail the calibration of the meters and voltage outputs for the LPS-151/152 power supply. Also included are transformer tap changing directions so that the power supply may be used with a line voltage other than 120Vac.

7.1 PREPARATION

1. Adjustment of Meter Mechanical Zero.

- a. Turn the power supply off and allow one minute for all capacitors to discharge.
- b. On the voltmeter, turn the zero adjust screw (20) so that the pointer indicates exactly zero.
- c. When the pointer is at zero, rotate the screw a small amount in the opposite direction to the direction it was last turned in step b to relieve movement tension.

- d. On the ammeter, turn the zero adjust screw (22) so that the pointer indicates exactly zero.

- e. When the pointer is at zero, rotate the screw a small amount in the opposite direction to the direction it was last turned in step d to relieve meter movement tension.

2. Initial Control Settings

Set the front panel controls to the positions indicated.

VOLTAGE +6V (18) full counterclockwise
CURRENT controls (12), (14), (17) . full counterclockwise
REFERENCE $\pm 25V$ (6) full counterclockwise
TRACKING RATIO selector (7) FIXED
REFERENCE +25 METER selector (3) pushed in

7.2 ADJUSTMENT OF METER ZERO WITH POWER ON

1. +25V range
 - a. Turn the power on.
 - b. Push the REFERENCE +25V METER selector button (3).
 - c. On circuit board T-2665A, adjust VR502 (0 ADJ) until the voltmeter indicates zero.
2. -25V range
 - a. Push the TRACKING -25V METER selector button (4).
 - b. On circuit board T-2665A, adjust VR504 (0 ADJ) until the voltmeter indicates zero.
3. +6V range
 - a. Push the +6V METER selector button (5).
 - b. On circuit board T-2665A, adjust VR506 (0 ADJ) until the voltmeter indicates zero.

7.3 ADJUSTMENT OF THE VOLTMETER WITH POWER ON

1. +25V rangePush the REFERENCE +25V METER selector button (3).
 - b. Connect a known calibrated voltmeter across the +25V output (+) and COM (-) terminals.
 - c. Set the REFERENCE/±25V control so that the voltmeter reads 25.0Vdc.
 - d. On circuit board T-2665A, adjust VR501 (VOLTS) so that the voltmeter indicates 25V.
2. -25V range
 - a. Push the TRACKING -25V METER selector button (4).
 - b. Connect a known calibrated voltmeter across the -25V output (+) and COM (-) terminals.
 - c. Confirm that the voltmeter and the power supply voltmeter both indicate -25V.
3. +6V range
 - a. Push the +6V METER selector button (5).
 - b. Connect a known calibrated voltmeter across the +6V (+) and COM (-) terminals.
 - c. Use the +6V voltage control to make the voltmeter indicate 6.0Vdc. The power supply voltmeter should indicate 6 volts.

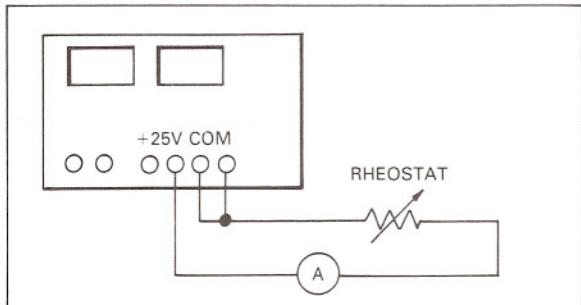


Figure 7-1.

7.4 AMMETER ADJUSTMENTS

1. +0.5A range
 - a. Push the REFERENCE +25V METER selector button.
 - b. Set the +0.5A (1A for the LPS-152) CURRENT control fully clockwise.
 - c. Connect a known calibrated ammeter and a 12.5W (25W for the LPS-152) rheostat as shown in Figure 7-1.
 - d. Set the REFERENCE/±25V control so that the voltmeter indicates 25V.
 - e. Adjust the rheostat so that the installed ammeter indicates 0.5A (1.0A for the LPS-152).
 - f. On circuit board T-2665A, adjust VR503 (FULL SCALE) for a reading of +0.5A (1.0A for the LPS-152) on the power supply ammeter.

2. -25V range

- a. Push the TRACKING -25V METER selector button.
- b. Connect a known calibrated ammeter and a 12.5W (25W for the LPS-152) rheostat as shown in Figure 7-2.
- c. Set the -0.5A (-1A for the LPS-152) CURRENT control fully clockwise.
- d. Set the REFERENCE/±25V control so that the voltmeter indicates -25V.
- e. Adjust the rheostat so that the installed ammeter indicates -0.5A (-1.0A for the LPS-152).
- f. On circuit board T-2665A, adjust VR505 (FULL SCALE) for a reading of -0.5A (-1.0A for the LPS-152) on the power supply ammeter.

3. 3A range (5A for the LPS-152)

- a. Push the +6V METER selector button.
- b. Connect a known calibrated ammeter and a 18W (30W for the LPS-152) rheostat as shown in Figure 7-3.
- c. Set the 3A (5A for the LPS-152) CURRENT control fully clockwise.
- d. Set the REFERENCE/±25V control so that the voltmeter indicates +6V.
- e. Adjust the rheostat so that the installed ammeter indicates 3.0A (5.0A for the LPS-152).
- f. On circuit board T-2665A, adjust VR507 (FULL SCALE) for a reading of 3A (5A for the LPS-152) on the power supply ammeter.

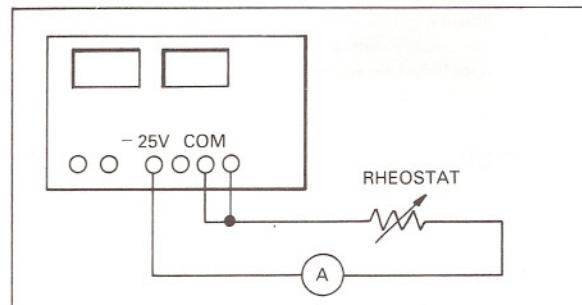


Figure 7-2.

7.5 CONNECTIONS FOR OTHER AC LINE VOLTAGES

The LPS-151/152 units shipped within the U.S. are connected for 120Vac operation. Other line voltages may be used after transformer tap connections are changed. Refer to Figure 7-4 for proper connections, and to Table 7-1 for permissible voltage ranges and proper fuse ratings.

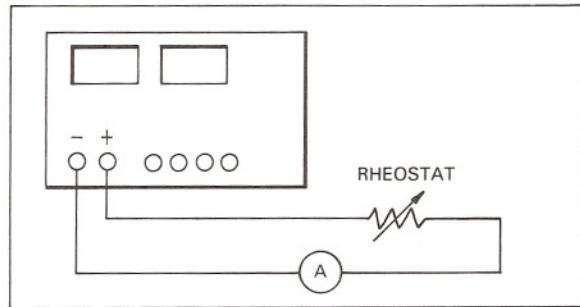


Figure 7-3.

Table 7-1
Permissible Voltage Variations and Fuse Ratings
For Tap Connections

| Nominal Value | Operating Voltage Range | Fuse Rating | |
|---------------|-------------------------|-------------|-----------|
| | | LPS-151 | LPS-152 |
| 100V | 90-110V | 2A | 3A |
| 120V | 108-132V | slow blow | slow blow |
| 200V | 180-220V | 1A | 1.5A |
| 220V | 198-242V | slow blow | slow blow |
| 240V | 216-264V | | |

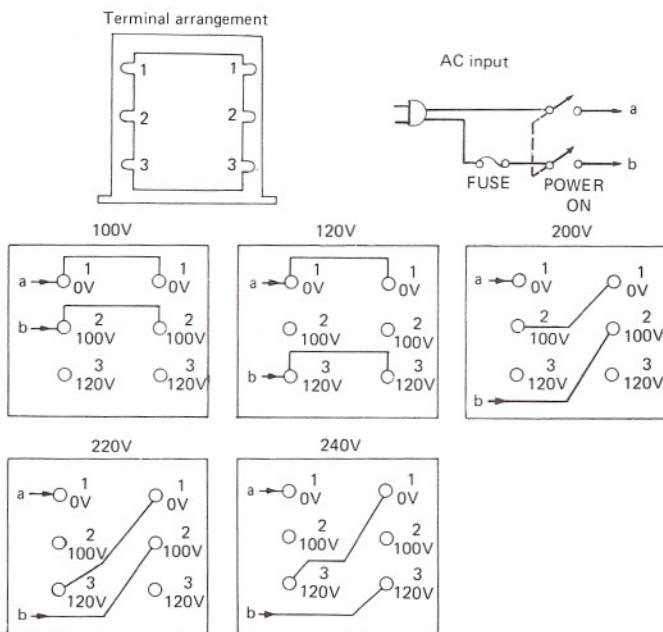


Figure 7-4. Transformer Tap Connections

8. REPLACEMENT PARTS LIST

8.1 LPS-151 Parts List.

| SCH. No. | Symbol No. | Description | | | | | | | |
|----------|------------|-------------|-----------|----|---------|--|-----|------|--------------|
| | | DIODES | | | | | | | |
| 1/3 | D101 | Rect | 200V | 1A | 1DZ61 | | 1/3 | Q201 | NPN |
| 1/3 | D102 | Rect | 200V | 1A | 1DZ61 | | 1/3 | Q202 | PNP |
| 1/3 | D103 | Zener | 7.5V | | 1Z75 | | 1/3 | Q301 | NPN |
| 1/3 | D104 | Det | 35V | | 1S1588 | | 1/3 | Q302 | PNP |
| 1/3 | D105 | Det | 35V | | 1S1588 | | 1/3 | Q401 | NPN |
| 1/3 | D106 | Det | 35V | | 1S1588 | | 1/3 | Q402 | PNP |
| 1/3 | D107 | Zener | 6.2V | | 1S251 | | | | |
| 1/3 | D108 | Zener | 9.1V | | RD91EB | | | | |
| 1/3 | D109 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C101 | Electrolytic |
| 1/3 | D201 | Rect | 150V | 3A | 3CD13 | | 1/3 | C102 | Mica |
| 1/3 | D202 | Rect | 150V | 3A | 3CD13 | | 1/3 | C103 | Electrolytic |
| 1/3 | D203 | Rect | 100V | 3A | 3BZ61 | | 1/3 | C201 | Plastic |
| 1/3 | D204 | Det | 35V | | 1S1588 | | 1/3 | C202 | Plastic |
| 1/3 | D205 | Det | 35V | | 1S1588 | | 1/3 | C203 | Electrolytic |
| 1/3 | D206 | Det | 35V | | 1S1588 | | 1/3 | C204 | Plastic |
| 1/3 | D207 | Det | 35V | | 1S1588 | | 1/3 | C205 | Plastic |
| 1/3 | D208 | Det | 35V | | 1S1588 | | 1/3 | C206 | Electrolytic |
| 1/3 | D209 | Det | 35V | | 1S1588 | | 1/3 | C207 | Electrolytic |
| 1/3 | D210 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C208 | Plastic |
| 1/3 | D301 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C301 | Plastic |
| 1/3 | D302 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C302 | Plastic |
| 1/3 | D303 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C303 | Electrolytic |
| 1/3 | D304 | Det | 35V | | 1S1588 | | 1/3 | C304 | Plastic |
| 1/3 | D305 | Det | 35V | | 1S1588 | | 1/3 | C305 | Plastic |
| 1/3 | D306 | Det | 35V | | 1S1588 | | 1/3 | C306 | Electrolytic |
| 1/3 | D307 | Det | 35V | | 1S1588 | | 1/3 | C307 | Electrolytic |
| 1/3 | D308 | Det | 35V | | 1S1588 | | 1/3 | C308 | Ceramic |
| 1/3 | D309 | Det | 35V | | 1S1588 | | 1/3 | C309 | Plastic |
| 1/3 | D310 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C401 | Plastic |
| 1/3 | D401 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C402 | Plastic |
| 1/3 | D402 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C403 | Electrolytic |
| 1/3 | D403 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C404 | Plastic |
| 1/3 | D404 | Rect | 200V | 1A | 1DZ61 | | 1/3 | C405 | Plastic |
| 1/3 | D405 | Det | 35V | | 1S1588 | | 1/3 | C406 | Electrolytic |
| 1/3 | D406 | Det | 35V | | 1S1588 | | 1/3 | C407 | Electrolytic |
| 1/3 | D407 | Det | 35V | | 1S1588 | | 1/3 | C408 | Ceramic |
| 1/3 | D408 | Det | 35V | | 1S1588 | | | | |
| 1/3 | D409 | Rect | 200V | 1A | 1DZ61 | | | | |
| 1/3 | D410 | Det | 35V | | 1S1588 | | | | |
| 2/3 | D501 | Det | 35V | | 1S1588 | | 1/3 | R101 | Wire wound |
| 1/3 | PL101 | LED | | | SLP-751 | | 1/3 | R102 | Wire wound |
| | | ICs | | | | | 1/3 | R103 | Wire wound |
| 1/3 | IC101 | Op Amp | LM301AP | | | | 1/3 | R104 | Wire wound |
| 1/3 | IC201 | Op Amp | 1458 | | | | 1/3 | R105 | Metal |
| 1/3 | IC301 | Op Amp | 1458 | | | | 1/3 | R106 | Metal |
| 1/3 | IC401 | Op Amp | 1458 | | | | 1/3 | R107 | Metal |
| | | TRANSISTORS | | | | | 1/3 | R108 | Carbon |
| 1/3 | Q101 | NPN | 2SC495-0 | | | | 1/3 | R109 | Carbon |
| 1/3 | Q102 | PNP | 2SA1012 | | | | 1/3 | R110 | Carbon |
| 1/3 | Q103 | NPN | 2SC1815-0 | | | | 1/3 | R111 | Carbon |
| 1/3 | Q104 | NPN | 2SC495-0 | | | | 1/3 | R112 | Carbon |
| 1/3 | Q105 | PNP | 2SA505-0 | | | | 1/3 | R113 | Carbon |

| SCH. No. | Symbol No. | Description | | | | | | | |
|----------|------------|--------------|--------------|------|--|--|-----|------|--------------|
| | | TRANSISTORS | | | | | | | |
| 1/3 | Q201 | NPN | 2SD717-0 | | | | 1/3 | Q202 | PNP |
| 1/3 | Q202 | PNP | 2SB755-0 | | | | 1/3 | Q301 | NPN |
| 1/3 | Q301 | NPN | 2SC495-0 | | | | 1/3 | Q302 | PNP |
| 1/3 | Q302 | PNP | 2SB755-0 | | | | 1/3 | Q401 | NPN |
| 1/3 | Q401 | NPN | 2SD845-0 | | | | 1/3 | Q402 | PNP |
| 1/3 | Q402 | PNP | 2SA505-0 | | | | | | |
| | | CAPACITORS | | | | | | | |
| 1/3 | C101 | Electrolytic | 100V 1000μF | | | | 1/3 | C102 | Mica |
| 1/3 | C102 | Mica | 500V 330pF | ±10% | | | 1/3 | C103 | Electrolytic |
| 1/3 | C103 | Electrolytic | 50V 0.47μF | ±20% | | | 1/3 | C201 | Plastic |
| 1/3 | C201 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C202 | Plastic |
| 1/3 | C202 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C203 | Electrolytic |
| 1/3 | C203 | Electrolytic | 25V 10.000μF | | | | 1/3 | C204 | Plastic |
| 1/3 | C204 | Plastic | 50V 0.01μF | ±10% | | | 1/3 | C205 | Plastic |
| 1/3 | C205 | Plastic | 50V 0.0047μF | ±10% | | | 1/3 | C206 | Electrolytic |
| 1/3 | C206 | Electrolytic | 50V 10μF | | | | 1/3 | C207 | Electrolytic |
| 1/3 | C207 | Electrolytic | 16V 1.000μF | | | | 1/3 | C208 | Plastic |
| 1/3 | C208 | Plastic | 63V 1μF | ±10% | | | | | |
| 1/3 | C301 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C302 | Plastic |
| 1/3 | C302 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C303 | Electrolytic |
| 1/3 | C303 | Electrolytic | 63V 2200μF | | | | 1/3 | C304 | Plastic |
| 1/3 | C304 | Plastic | 50V 0.0022μF | ±10% | | | 1/3 | C305 | Plastic |
| 1/3 | C305 | Plastic | 50V 0.0022μF | ±10% | | | | | |
| 1/3 | C306 | Electrolytic | 50V 10μF | | | | 1/3 | C307 | Electrolytic |
| 1/3 | C307 | Electrolytic | 50V 220μF | | | | 1/3 | C308 | Ceramic |
| 1/3 | C308 | Ceramic | 50V 0.1μF | | | | 1/3 | C309 | Plastic |
| 1/3 | C309 | Plastic | 50V 0.0033μF | ±10% | | | | | |
| 1/3 | C401 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C402 | Plastic |
| 1/3 | C402 | Plastic | 400V 0.047μF | ±10% | | | 1/3 | C403 | Electrolytic |
| 1/3 | C403 | Electrolytic | 63V 2200μF | | | | 1/3 | C404 | Plastic |
| 1/3 | C404 | Plastic | 50V 0.01μF | ±10% | | | 1/3 | C405 | Plastic |
| 1/3 | C405 | Plastic | 50V 0.0033μF | ±10% | | | | | |
| 1/3 | C406 | Electrolytic | 50V 10μF | | | | 1/3 | C407 | Electrolytic |
| 1/3 | C407 | Electrolytic | 50V 220μF | | | | 1/3 | C408 | Ceramic |
| 1/3 | C408 | Ceramic | 50V 0.1μF | | | | | | |
| | | RESISTORS | | | | | | | |
| 1/3 | R101 | Wire wound | 31Ω ±5% | | | | 1/3 | R102 | Wire wound |
| 1/3 | R102 | Wire wound | 130Ω ±5% | | | | 1/3 | R103 | Wire wound |
| 1/3 | R103 | Wire wound | 250Ω ±5% | | | | 1/3 | R104 | Wire wound |
| 1/3 | R104 | Wire wound | 100Ω ±5% | | | | 1/3 | R105 | Metal |
| 1/3 | R105 | Metal | 880Ω ±1% | 1/4W | | | | | |
| 1/3 | R106 | Metal | 10kΩ ±1% | 1/4W | | | 1/3 | R107 | Metal |
| 1/3 | R107 | Metal | 10kΩ ±1% | 1/4W | | | 1/3 | R108 | Carbon |
| 1/3 | R108 | Carbon | 15kΩ ±5% | 1/4W | | | 1/3 | R109 | Carbon |
| 1/3 | R109 | Carbon | 220Ω ±5% | 1/2W | | | 1/3 | R110 | Carbon |
| 1/3 | R110 | Carbon | 10kΩ ±5% | 1/4W | | | | | |
| 1/3 | R111 | Carbon | 3.3kΩ ±5% | 1/4W | | | 1/3 | R112 | Carbon |
| 1/3 | R112 | Carbon | 10kΩ ±5% | 1/4W | | | 1/3 | R113 | Carbon |
| 1/3 | R113 | Carbon | 15kΩ ±5% | 1/4W | | | 1/3 | R114 | Carbon |
| 1/3 | R114 | Carbon | 1.2kΩ ±5% | 1/4W | | | | | |

| SCH. No. | Symbol No. | Description | | |
|---------------------------|------------|-------------|-------|----------|
| RESISTORS | | | | |
| 1/3 | R201 | Carbon | 2.2kΩ | ±5% ½W |
| 1/3 | R202 | Wire wound | 50Ω | ±5% 10W |
| 1/3 | R203 | Carbon | 820Ω | ±5% ½W |
| 1/3 | R204 | | | |
| 1/3 | R205 | | | |
| 1/3 | R206 | Carbon | 7.5kΩ | ±5% ½W |
| 1/3 | R207 | Metal | 150kΩ | ±1% ¼W |
| 1/3 | R208 | Metal | 100Ω | ±1% ¼W |
| 1/3 | R209 | Carbon | 750Ω | ±5% ¼W |
| 1/3 | R210 | Wire wound | 0.25Ω | ±5% 5W |
| 1/3 | R211 | Carbon | 220Ω | ±5% ¼W |
| 1/3 | R212 | Metal | 39kΩ | ±1% ¼W |
| 1/3 | R213 | Carbon | 330Ω | ±5% ¼W |
| 1/3 | R214 | Carbon | 18Ω | ±5% ½W |
| 1/3 | R215 | Metal | 9.1kΩ | ±1% ¼W |
| 1/3 | R216 | Wire wound | 0.1Ω | ±5% 2W |
| 1/3 | R301 | Carbon | 5.6kΩ | ±5% ½W |
| 1/3 | R302 | Metal | 560Ω | ±5% 1W |
| 1/3 | R303 | Carbon | 820Ω | ±5% ½W |
| 1/3 | R304 | Carbon | 15kΩ | ±5% ½W |
| 1/3 | R305 | Metal | 100kΩ | ±1% ¼W |
| 1/3 | R306 | Metal | 560Ω | ±1% ¼W |
| 1/3 | R307 | Metal | 5.6kΩ | ±1% ¼W |
| 1/3 | R308 | Wire wound | 1.5Ω | ±5% 5W |
| 1/3 | R309 | Carbon | 220Ω | ±5% ¼W |
| 1/3 | R310 | Metal | 3.9kΩ | ±1% ¼W |
| 1/3 | R311 | Carbon | 1.5kΩ | ±5% ¼W |
| 1/3 | R312 | Carbon | 18Ω | ±5% ½W |
| 1/3 | R313 | Metal | 2.2kΩ | ±1% ¼W |
| 1/3 | R314 | Wire wound | 0.1Ω | ±5% 2W |
| 1/3 | R401 | Carbon | 5.6kΩ | ±5% ½W |
| 1/3 | R402 | Carbon | 820Ω | ±5% ½W |
| 1/3 | R403 | Carbon | 560Ω | ±5% ½W |
| 1/3 | R404 | Carbon | 15kΩ | ±5% ¼W |
| 1/3 | R405 | Metal | 560Ω | ±1% ¼W |
| 1/3 | R406 | Carbon | 1.5kΩ | ±5% ¼W |
| 1/3 | R407 | Carbon | 18Ω | ±5% ½W |
| 1/3 | R408 | Carbon | 220Ω | ±5% ¼W |
| 1/3 | R409 | Wire wound | 1.5Ω | ±5% 5W |
| 1/3 | R410 | Metal | 3.9kΩ | ±1% ¼W |
| 1/3 | R411 | Metal | 22kΩ | ±1% ¼W |
| 1/3 | R412 | Metal | 10kΩ | ±1% ¼W |
| 1/3 | R413 | Metal | 22kΩ | ±1% ¼W |
| 1/3 | R414 | | | |
| 1/3 | R415 | Wire wound | 0.1Ω | ±5% 2W |
| VARIABLE RESISTORS | | | | |
| 1/3 | VR201 | Wire wound | 10kΩB | ±5% 1.2W |
| 1/3 | VR202 | Wire wound | 3kΩB | ±5% 1.2W |
| 1/3 | VR301 | Wire wound | 10kΩB | ±5% 1.2W |
| 1/3 | VR302 | Wire wound | 3kΩB | ±5% 1.2W |

| SCH. No. | Symbol No. | Description | | |
|-------------------------------|------------|-------------------|-------------------|----------|
| VARIABLE RESISTORS | | | | |
| 1/3 | VR401 | Wire wound | 3kΩB | ±5% 1.2W |
| 1/3 | VR402 | Wire wound | 10kΩB | ±5% 1.2W |
| 2/3 | VR501 | Metal glaze | 220Ω | ½W |
| 2/3 | VR502 | Metal glaze | 1kΩ | ½W |
| 2/3 | VR503 | Metal glaze | 1kΩ | ½W |
| 2/3 | VR504 | Metal glaze | 1kΩ | ½W |
| 2/3 | VR505 | Metal glaze | 1kΩ | ½W |
| 2/3 | VR506 | Metal glaze | 1kΩ | ½W |
| 2/3 | VR507 | Metal glaze | 1kΩ | ½W |
| TRANSFORMER | | | | |
| 1/3 | PT101 | Power Transformer | J-459A | |
| CONNECTORS | | | | |
| 1/3 | J101 | XH Connector | {B2B-XH XHP-2} | |
| 1/3 | J201 | XH Connector | {B2B-XH XHP-2} | |
| 1/3 | J202 | XH Connector | {B3B-XH XHP-3} | |
| 1/3 | J301 | XH Connector | {B2B-XH XHP-2} | |
| 1/3 | J302 | XH Connector | {B3B-XH XHP-3} | |
| 1/3 | J401 | XH Connector | {B3B-XH XHP-3} | |
| 1/3 | J402 | XH Connector | {B3B-XH XHP-3} | |
| 3/3 | J403 | XH Connector | {B9B-XH XHP-9} | |
| 1/3 | J501 | XH Connector | {B2B-XH XHP-2} | |
| 1/3 | J502 | XH Connector | {B2B-XH XHP-2} | |
| FUSE & HOLDER | | | | |
| 1/3 | F501 | 90 — 132V Holder | ST-42A FH-032 | |
| | | 180 — 264V | ST-41A | |
| METERS | | | | |
| 2/3 | M501 | | H-1690 | |
| 2/3 | M502 | | H-1691 | |
| SWITCHES | | | | |
| 1/3 | S401 | Slide | SSB022L=9 | |
| 1/3 | S501 | Power | SDG5P-E | |
| 2/3 | S502 | Push | S-3-14 | |
| TERMINALS | | | | |
| 1/3 | 101 | Metal Terminal | D-1376A | |
| 1/3 | 201 | Leader Terminal | Gray | |
| 1/3 | 202 | Leader Terminal | Gray | |
| 1/3 | 301 | Leader Terminal | Gray | |
| 1/3 | 302 | Leader Terminal | Gray | |
| 1/3 | 401 | Leader Terminal | Gray | |
| PRINTED CIRCUIT BOARDS | | | | |
| 1/3 | | T-2672B | Power Supply | |
| 2/3 | | T-2665A | Meter | |

8.2 LPS-152 Parts List.

| SCH. No. | Symbol No. | Description | | | |
|--------------------|------------|-------------|-----------|----|---------|
| DIODES | | | | | |
| 1/3 | D101 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D102 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D103 | Zener | 7.5V | | 1Z75 |
| 1/3 | D104 | Det | 35V | | IS1588 |
| 1/3 | D105 | Det | 35V | | IS1588 |
| 1/3 | D106 | Det | 35V | | IS1588 |
| 1/3 | D107 | Zener | 6.2V | | 1SZ51 |
| 1/3 | D108 | Zener | 9.1V | | RD91EB |
| 1/3 | D109 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D201 | Rect | 150V | 6A | 6CD13 |
| 1/3 | D202 | Rect | 150V | 6A | 6CD13 |
| 1/3 | D203 | Rect | 100V | 3A | 3BZ61 |
| 1/3 | D204 | Det | 35V | | IS1588 |
| 1/3 | D205 | Det | 35V | | IS1588 |
| 1/3 | D206 | Det | 35V | | IS1588 |
| 1/3 | D207 | Det | 35V | | IS1588 |
| 1/3 | D208 | Det | 35V | | IS1588 |
| 1/3 | D209 | Det | 35V | | IS1588 |
| 1/3 | D210 | Rect | 100V | 3A | 3BZ61 |
| 1/3 | D301 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D302 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D303 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D304 | Det | 35V | | IS1588 |
| 1/3 | D305 | Det | 35V | | IS1588 |
| 1/3 | D306 | Det | 35V | | IS1588 |
| 1/3 | D307 | Det | 35V | | IS1588 |
| 1/3 | D308 | Det | 35V | | IS1588 |
| 1/3 | D309 | Det | 35V | | IS1588 |
| 1/3 | D310 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D401 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D402 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D403 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D404 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D405 | Det | 35V | | IS1588 |
| 1/3 | D406 | Det | 35V | | IS1588 |
| 1/3 | D407 | Det | 35V | | IS1588 |
| 1/3 | D408 | Det | 35V | | IS1588 |
| 1/3 | D409 | Rect | 200V | 1A | IDZ61 |
| 1/3 | D410 | Det | 35V | | IS1588 |
| 2/3 | D501 | Det | 35V | | IS1588 |
| 1/3 | PL101 | LED | | | SLP-751 |
| ICs | | | | | |
| 1/3 | IC101 | Op Amp | LM301AP | | |
| 1/3 | IC201 | Op Amp | 1458 | | |
| 1/3 | IC301 | Op Amp | 1458 | | |
| 1/3 | IC401 | Op Amp | 1458 | | |
| TRANSISTORS | | | | | |
| 1/3 | Q101 | NPN | 2SC495-0 | | |
| 1/3 | Q102 | PNP | 2SA1012 | | |
| 1/3 | Q103 | NPN | 2SC1815-0 | | |
| 1/3 | Q104 | NPN | 2SC495-0 | | |
| 1/3 | Q105 | PNP | 2SA505-0 | | |
| 1/3 | Q201 | NPN | 2SD717-0 | | |
| 1/3 | Q202 | PNP | 2SB755-0 | | |
| 1/3 | Q203 | PNP | 2SB755-0 | | |

| SCH. No. | Symbol No. | Description | | | |
|-------------------|------------|--------------|---------------|----------------|------------|
| 1/3 | Q301 | NPN | 2SC495-0 | | |
| 1/3 | Q302 | PNP | 2SB755-0 | | |
| 1/3 | Q401 | NPN | 2SD845-0 | | |
| 1/3 | Q402 | PNP | 2SA505-0 | | |
| CAPACITORS | | | | | |
| 1/3 | C101 | Electrolytic | 100V | 1000 μ F | |
| 1/3 | C102 | Mica | 500V | 330pF | $\pm 10\%$ |
| 1/3 | C103 | Electrolytic | 50V | 0.47 μ F | $\pm 20\%$ |
| 1/3 | C201 | Plastic | 400V | 0.047 μ F | $\pm 10\%$ |
| 1/3 | C202 | Plastic | 400V | 0.047 μ F | $\pm 10\%$ |
| 1/3 | C203 | Electrolytic | 25V | 10,000 μ F | |
| 1/3 | C204 | Plastic | 50V | 0.01 μ F | $\pm 10\%$ |
| 1/3 | C205 | Plastic | 50V | 0.0047 μ F | $\pm 10\%$ |
| 1/3 | C206 | Electrolytic | 50V | 10 μ F | |
| 1/3 | C207 | Electrolytic | 16V | 1,000 μ F | |
| 1/3 | C208 | Plastic | 63V | 1 μ F | $\pm 10\%$ |
| 1/3 | C301 | Plastic | 400V | 0.047 μ F | $\pm 10\%$ |
| 1/3 | C302 | Plastic | 400V | 0.047 μ F | $\pm 10\%$ |
| 1/3 | C303 | Electrolytic | 63V | 2200 μ F | |
| 1/3 | C304 | Plastic | 50V | 0.0022 μ F | $\pm 10\%$ |
| 1/3 | C305 | Plastic | 50V | 0.0022 μ F | $\pm 10\%$ |
| 1/3 | C306 | Electrolytic | 50V | 10 μ F | |
| 1/3 | C307 | Electrolytic | 50V | 220 μ F | |
| 1/3 | C308 | Ceramic | 50V | 0.1 μ F | |
| 1/3 | C309 | Plastic | 50V | 0.0033 μ F | $\pm 10\%$ |
| RESISTORS | | | | | |
| 1/3 | R101 | Wire wound | 31 Ω | $\pm 5\%$ | 5W |
| 1/3 | R102 | Wire wound | 130 Ω | $\pm 5\%$ | 3W |
| 1/3 | R103 | Wire wound | 250 Ω | $\pm 5\%$ | 3W |
| 1/3 | R104 | Wire wound | 100 Ω | $\pm 5\%$ | 10W |
| 1/3 | R105 | Metal | 880 Ω | $\pm 1\%$ | 1/4W |
| 1/3 | R106 | Metal | 10k Ω | $\pm 1\%$ | 1/4W |
| 1/3 | R107 | Metal | 10k Ω | $\pm 1\%$ | 1/4W |
| 1/3 | R108 | Carbon | 15k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R109 | Carbon | 220 Ω | $\pm 5\%$ | 1/2W |
| 1/3 | R110 | Carbon | 10k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R111 | Carbon | 3.3k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R112 | Carbon | 10k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R113 | Carbon | 15k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R114 | Carbon | 1.2k Ω | $\pm 5\%$ | 1/4W |
| 1/3 | R201 | Carbon | 2.2k Ω | $\pm 5\%$ | 1/2W |
| 1/3 | R202 | Wire wound | 50 Ω | $\pm 5\%$ | 10W |
| 1/3 | R203 | Carbon | 820 Ω | $\pm 5\%$ | 1/2W |
| 1/3 | R204 | Wire wound | 0.1 Ω | $\pm 5\%$ | 2W |
| 1/3 | R205 | Wire wound | 0.1 Ω | $\pm 5\%$ | 2W |
| 1/3 | R206 | Carbon | 7.5k Ω | $\pm 5\%$ | 1/2W |
| 1/3 | R207 | Metal | 150k Ω | $\pm 1\%$ | 1/4W |
| 1/3 | R208 | Metal | 100 Ω | $\pm 1\%$ | 1/4W |

| SCH. No. | Symbol No. | Description | | | |
|---------------------------|------------|-------------|-------|-----|------|
| RESISTORS | | | | | |
| 1/3 | R209 | Carbon | 750Ω | ±5% | 1/4W |
| 1/3 | R210 | Wire wound | 0.25Ω | ±5% | 5W |
| 1/3 | R211 | Carbon | 220Ω | ±5% | 1/4W |
| 1/3 | R212 | Metal | 39kΩ | ±1% | 1/4W |
| 1/3 | R213 | Carbon | 330Ω | ±5% | 1/4W |
| 1/3 | R214 | Carbon | 18Ω | ±5% | 1/2W |
| 1/3 | R215 | Metal | 9.1kΩ | ±1% | 1/4W |
| 1/3 | R216 | Wire wound | 0.1Ω | ±5% | 2W |
| 1/3 | R301 | Carbon | 5.6kΩ | ±5% | 1/2W |
| 1/3 | R302 | Metal | 560Ω | ±5% | 1W |
| 1/3 | R303 | Carbon | 820Ω | ±5% | 1/2W |
| 1/3 | R304 | Carbon | 15kΩ | ±5% | 1/2W |
| 1/3 | R305 | Metal | 100kΩ | ±1% | 1/4W |
| 1/3 | R306 | Metal | 560Ω | ±1% | 1/4W |
| 1/3 | R307 | Metal | 5.6kΩ | ±1% | 1/4W |
| 1/3 | R308 | Wire wound | 0.5Ω | ±5% | 5W |
| 1/3 | R309 | Carbon | 150Ω | ±5% | 1/4W |
| 1/3 | R310 | Metal | 39kΩ | ±1% | 1/4W |
| 1/3 | R311 | Carbon | 1.5kΩ | ±5% | 1/4W |
| 1/3 | R312 | Carbon | 18Ω | ±5% | 1/2W |
| 1/3 | R313 | Metal | 2.2kΩ | ±1% | 1/4W |
| 1/3 | R314 | Wire wound | 0.1Ω | ±5% | 2W |
| 1/3 | R401 | Carbon | 5.6kΩ | ±5% | 1/2W |
| 1/3 | R402 | Carbon | 820Ω | ±5% | 1/2W |
| 1/3 | R403 | Carbon | 560Ω | ±5% | 1/2W |
| 1/3 | R404 | Carbon | 15kΩ | ±5% | 1/4W |
| 1/3 | R405 | Metal | 560Ω | ±1% | 1/4W |
| 1/3 | R406 | Carbon | 1.5kΩ | ±5% | 1/4W |
| 1/3 | R407 | Carbon | 18Ω | ±5% | 1/2W |
| 1/3 | R408 | Carbon | 150Ω | ±5% | 1/4W |
| 1/3 | R409 | Wire wound | 0.5Ω | ±5% | 5W |
| 1/3 | R410 | Metal | 39kΩ | ±1% | 1/4W |
| 1/3 | R411 | Metal | 22kΩ | ±1% | 1/4W |
| 1/3 | R412 | Metal | 10kΩ | ±1% | 1/4W |
| 1/3 | R413 | Metal | 22kΩ | ±1% | 1/4W |
| 1/3 | R414 | | | | |
| 1/3 | R415 | Wire wound | 0.1Ω | ±5% | 2W |
| 2/3 | R501 | Carbon | 390Ω | ±5% | 1/4W |
| 2/3 | R502 | Carbon | 470Ω | ±5% | 1/4W |
| 2/3 | R503 | Metal | 12kΩ | ±1% | 1/4W |
| 2/3 | R504 | Metal | 200Ω | ±1% | 1/4W |
| 2/3 | R505 | Metal | 2.4kΩ | ±1% | 1/4W |
| VARIABLE RESISTORS | | | | | |
| 1/3 | VR201 | Wire wound | 10kΩB | ±5% | 1.2W |
| 1/3 | VR202 | Wire wound | 3kΩB | ±5% | 1.2W |
| 1/3 | VR301 | Wire wound | 10kΩB | ±5% | 1.2W |
| 1/3 | VR302 | Wire wound | 3kΩB | ±5% | 1.2W |
| 1/3 | VR401 | Wire wound | 3kΩB | ±5% | 1.2W |
| 1/3 | VR402 | Wire wound | 10kΩB | ±5% | 1.2W |
| 2/3 | VR501 | Metal glaze | 220Ω | | 1/2W |
| 2/3 | VR502 | Metal glaze | 1kΩ | | 1/2W |

| SCH. No. | Symbol No. | Description | | | |
|-------------------------------|------------|-------------------|-------------------|--|------|
| VARIABLE RESISTORS | | | | | |
| 2/3 | VR503 | Metal glaze | 1kΩ | | 1/2W |
| 2/3 | VR504 | Metal glaze | 1kΩ | | 1/2W |
| 2/3 | VR505 | Metal glaze | 1kΩ | | 1/2W |
| 2/3 | VR506 | Metal glaze | 1kΩ | | 1/2W |
| 2/3 | VR507 | Metal glaze | 1kΩ | | 1/2W |
| TRANSFORMER | | | | | |
| 1/3 | PT101 | Power Transformer | J-460A | | |
| CONNECTORS | | | | | |
| 1/3 | J101 | XH Connector | {B2B-XH XHP-2} | | |
| 1/3 | J201 | XH Connector | {B2B-XH XHP-2} | | |
| 1/3 | J202 | XH Connector | {B3B-XH XHP-3} | | |
| 1/3 | J301 | XH Connector | {B2B-XH XHP-2} | | |
| 1/3 | J302 | XH Connector | {B3B-XH XHP-3} | | |
| 1/3 | J401 | XH Connector | {B3B-XH XHP-3} | | |
| 1/3 | J402 | XH Connector | {B3B-XH XHP-3} | | |
| 3/3 | J403 | XH Connector | {B9B-XH XHP-9} | | |
| 1/3 | J501 | XH Connector | {B2B-XH XHP-2} | | |
| 1/3 | J502 | XH Connector | {B2B-XH XHP-2} | | |
| FUSE & HOLDER | | | | | |
| 1/3 | F501 | 90 — 132V | ST-4 3A | | |
| | | 180 — 264V | ST-4 1.5A | | |
| | | Holder | FH-032 | | |
| METERS | | | | | |
| | | | H-1692 | | |
| | | | H-1691 | | |
| SWITCHES | | | | | |
| 1/3 | S401 | Slide | SSB022 L=9 | | |
| 1/3 | S501 | Power | SDG5P-E | | |
| 2/3 | S502 | Push | S-3-14 | | |
| TERMINALS | | | | | |
| 1/3 | 101 | Metal Terminal | D-1376A | | |
| 1/3 | 201 | Leader Terminal | Gray | | |
| 1/3 | 202 | Leader Terminal | Gray | | |
| 1/3 | 301 | Leader Terminal | Gray | | |
| 1/3 | 302 | Leader Terminal | Gray | | |
| 1/3 | 401 | Leader Terminal | Gray | | |
| PRINTED CIRCUIT BOARDS | | | | | |
| 1/3 | T-2672B | Power Supply | | | |
| 2/3 | T-2665A | Meter | | | |

9. BLOCK DIAGRAM, P.C. BOARDS, AND SCHEMATICS

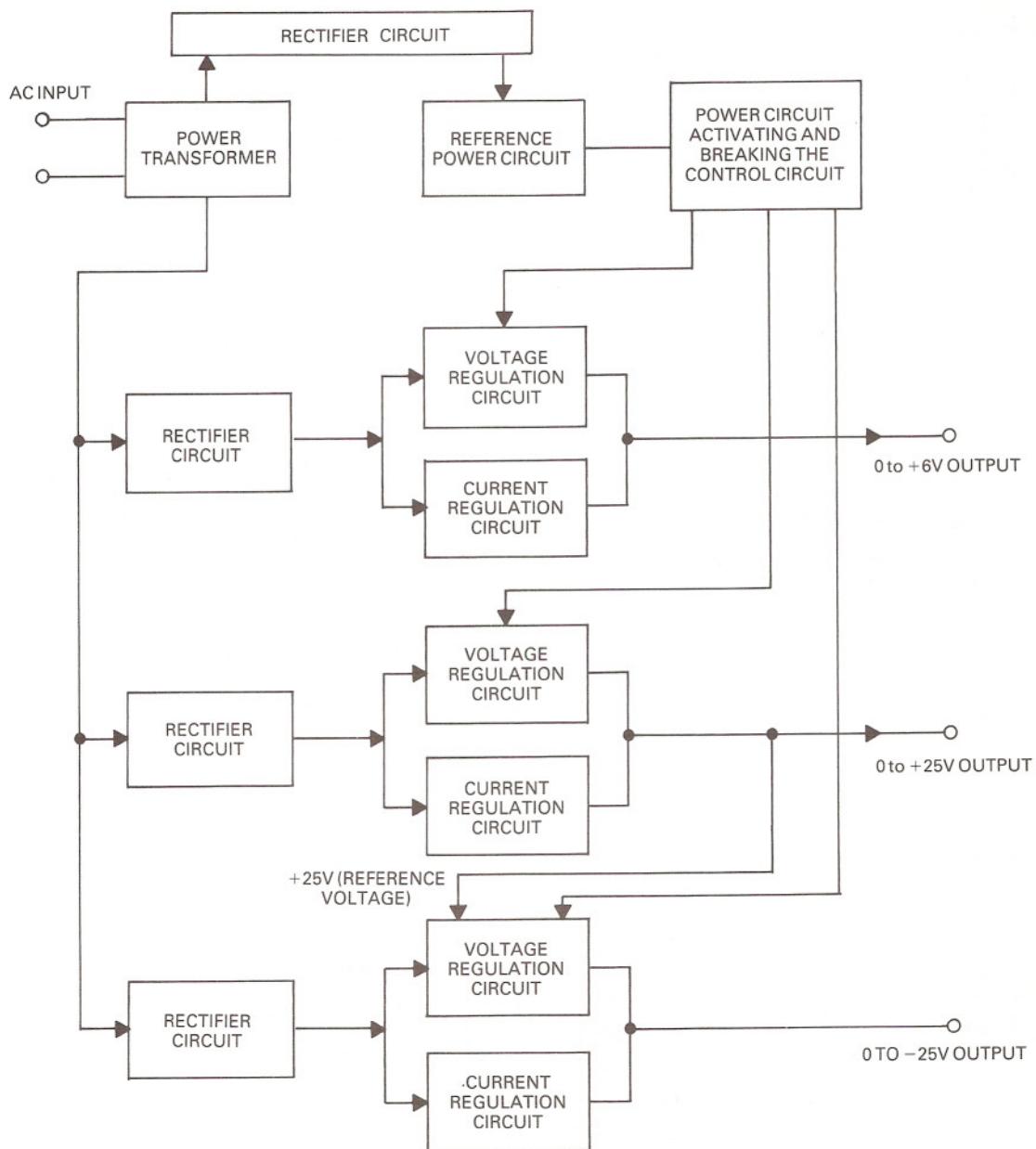


Figure 9-1. Block Diagram

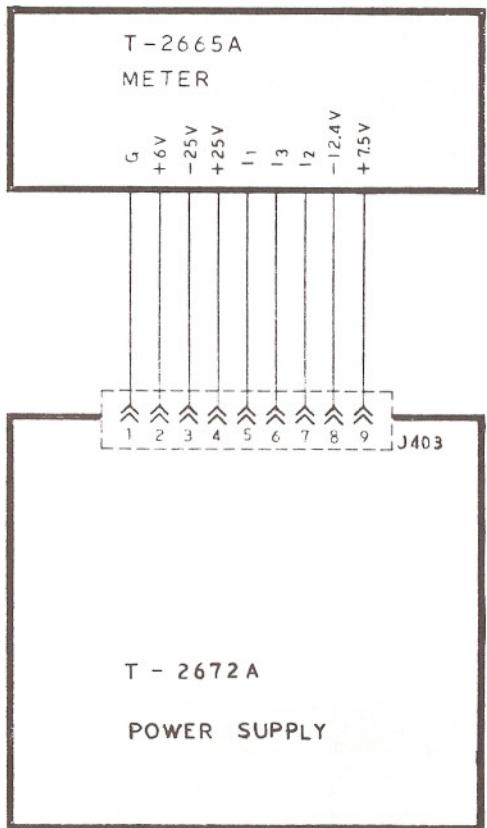


Figure 9-2. LPS-151/152 Block Diagram

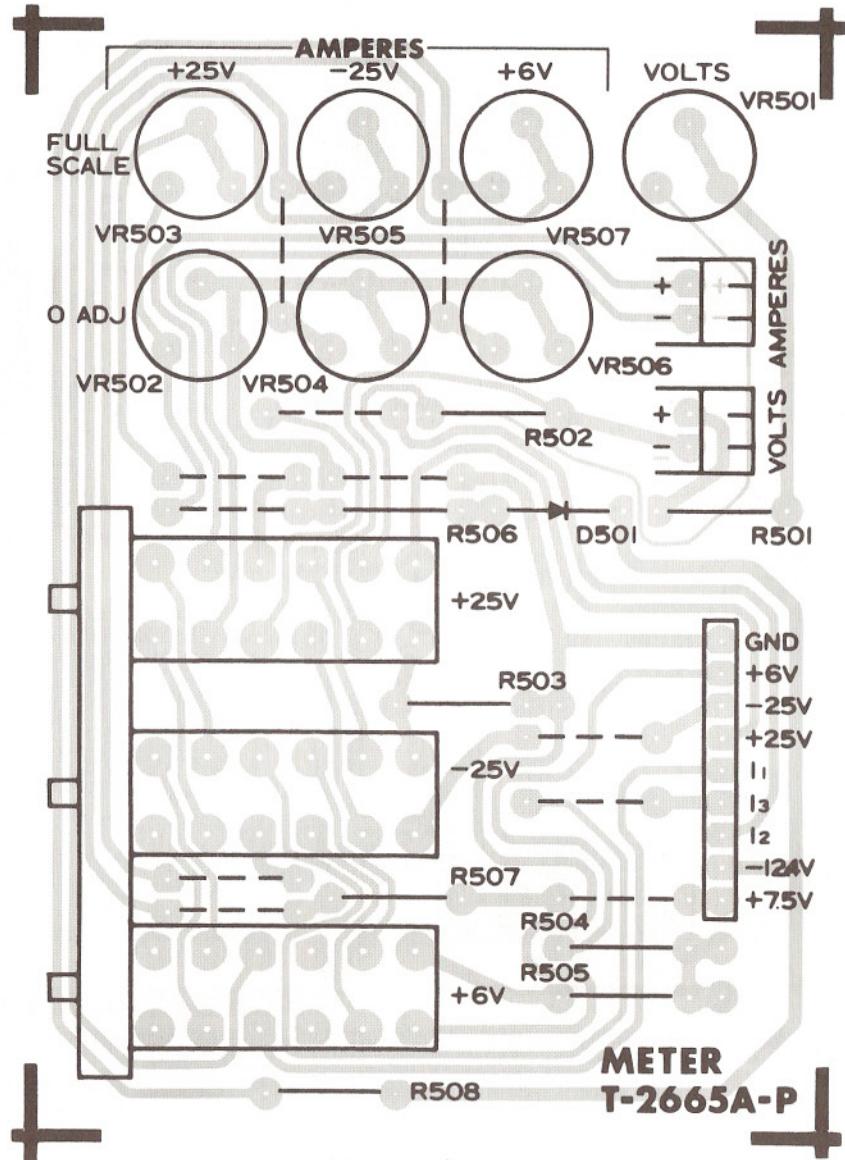


Figure 9-3. LPS-151/152 Meter Board, T2665A

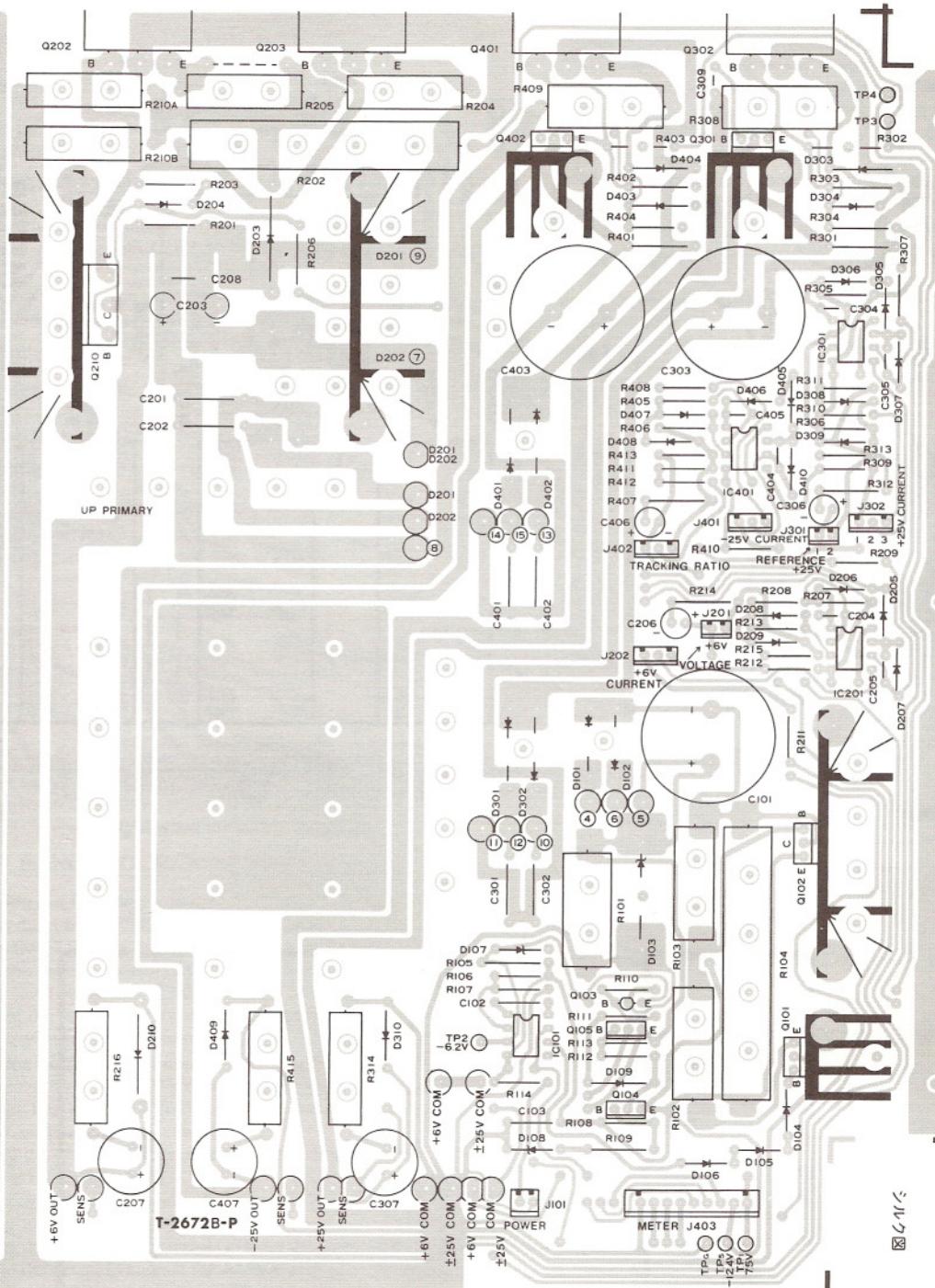


Figure 9-4. LPS-151/152 Power Supply Board, T2672A

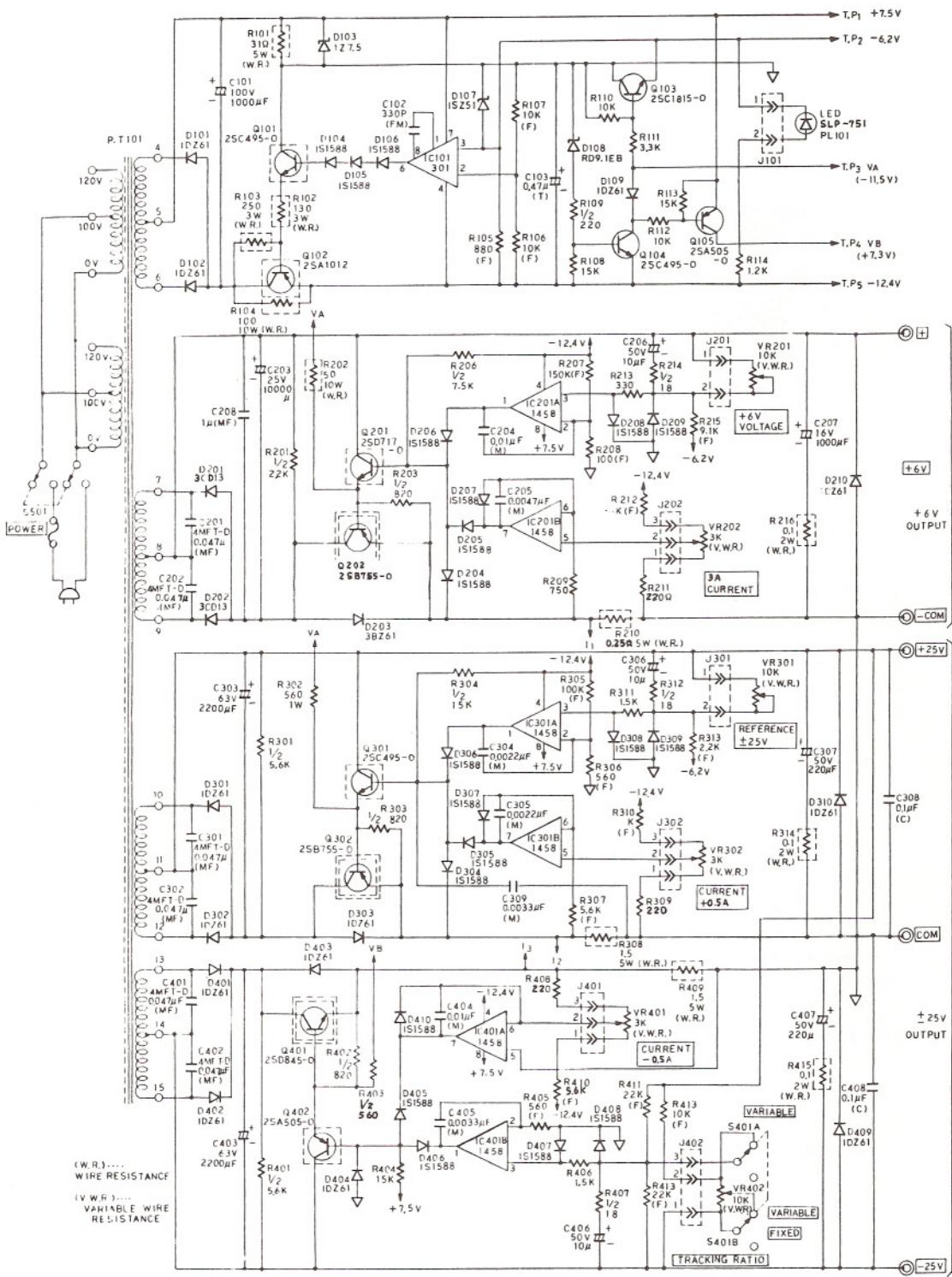


Figure 9-5. LPS-151 Power Supply Board, T2672A

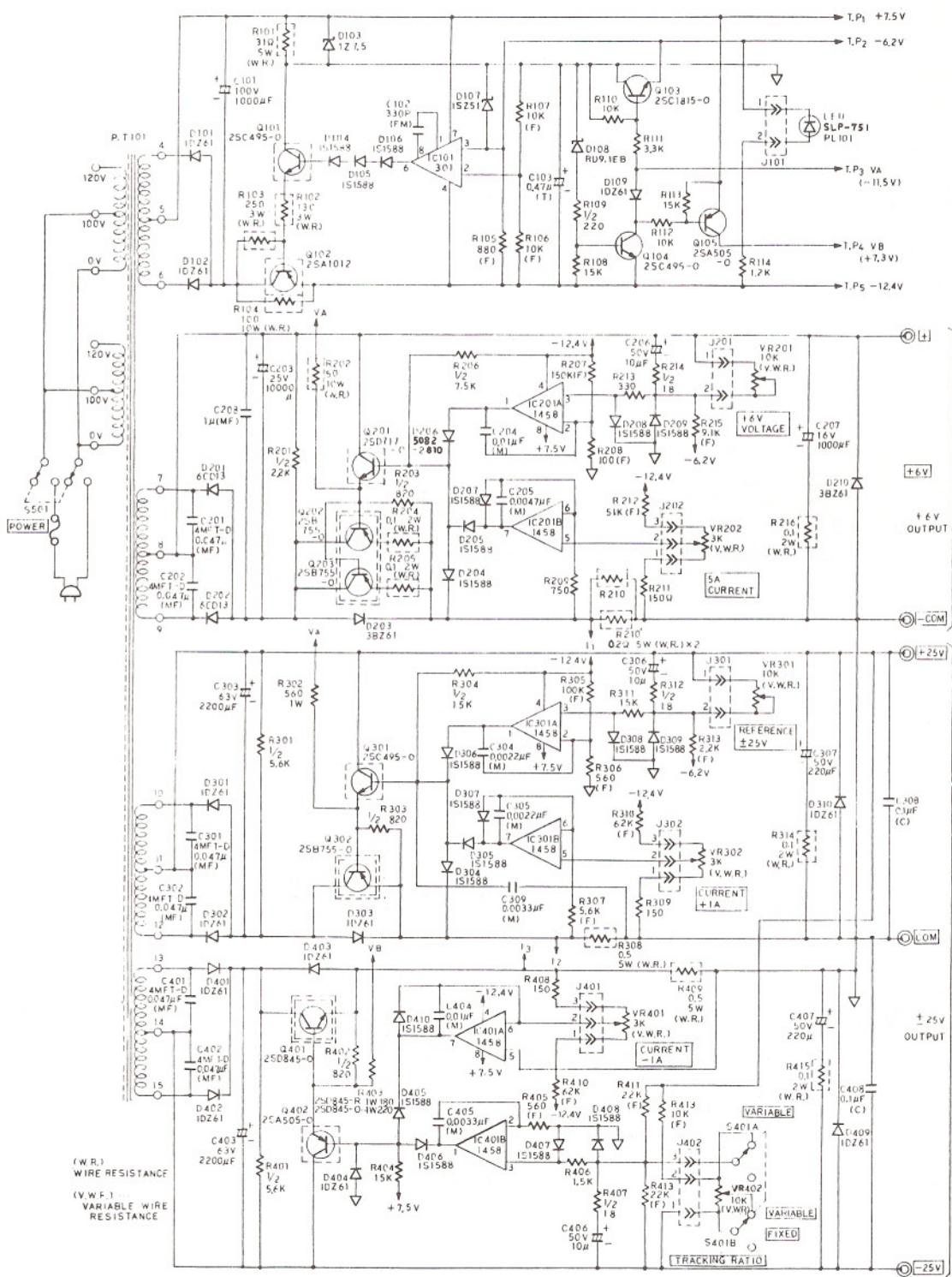


Figure 9-6. LPS-152 Power Supply Board, T2672A

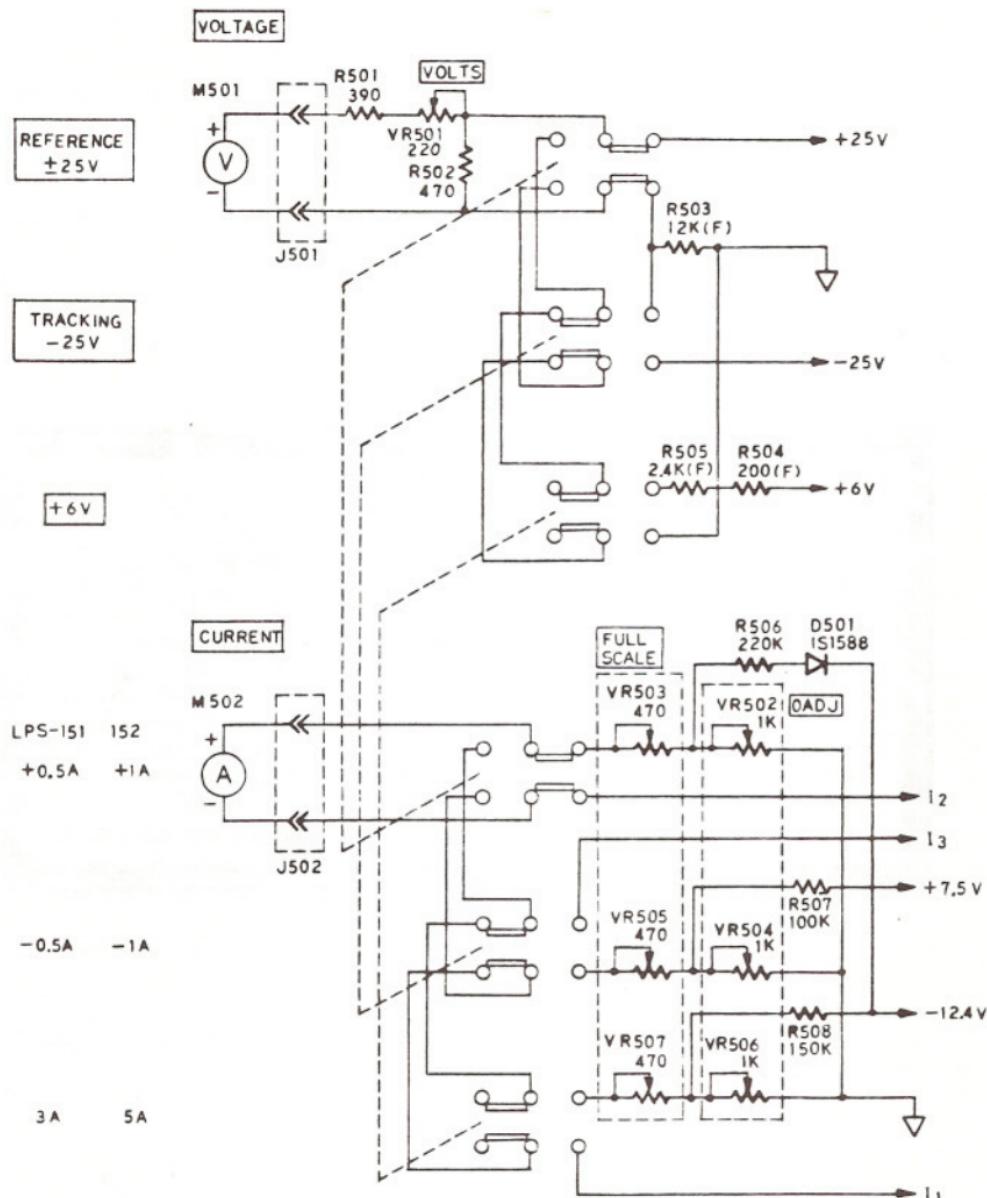


Figure 9-7 LPS-151/152 Meter Board, T2665A